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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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Development of USTES Aptitude Test Battery

for

Food-Service Supervisor

(hotel & rest.) 319.138

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MANPOWER ADMINISTRATION

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Technical Report on Development of USTES Aptitude Test Battery

For . . . . . .

Food Service Supervisor (hotel & rest.) 319.138-010

S-440

(Developed in Cooperation with the
Michigan State Employment Service)

U. S. Department of Labor
Manpower Administration
July 1969

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GATB Study #2755

DEVELOPMENT OF USTES APTITUDE TEST BATTERY

For

Food-Service Supervisor (hotel & rest.) 319.138-010
S-440

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Food-Service Supervisor, 319.138-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
G - General Learning Ability	95
Q - Clerical Perception	100
M - Manual Dexterity	110

RESEARCH SUMMARY

Sample:

11 female and 39 male students of the Food Service Supervision curriculum at Ferris State College, Big Rapids, Michigan. This study was initiated prior to the requirement of providing minority group information. Therefore, minority group composition is unknown.

Criterion:

The criterion consisted of the total grade-point average earned in the six-quarter Food Service Supervision curriculum.

Design:

Concurrent (test and criterion data were collected at approximately the same time). Minimum aptitude requirements were determined on the basis of a course analysis and statistical analyses of aptitude mean scores, standard deviations, and selective efficiencies.

Concurrent Validity:

Phi Coefficient = .24 ($p/2 < .05$)

Effectiveness of Norms:

Only 66% of the non-test-selected students in the sample used for this study were good students; if the students had been test-selected with the above norms, 76% would have been good students. 34% of the non-test-selected students used for this study were poor students; if the students had been test-selected with the above norms, only 24% would have poor students. The effectiveness of the norms is shown graphically in Table I.

TABLE I

Effectiveness of Norms

	Without Tests	With Tests
Good Students	66%	76%
Poor Students	34%	24%

SAMPLE DESCRIPTION

Size: N = 50

Occupational Status:

Students who completed six-quarter curriculum in Food Service Supervision.

Educational Institution:

School of Technical and Applied Arts, Collegiate Technical Division, Ferris State College, Big Rapids, Michigan.

Course Selection Requirements:

Education:

Graduation from high school or equivalent, or sufficient maturity, motivation and aptitude to profit from instruction.

Acceptance:

Acceptance into the curriculum is determined on the basis of information contained in the application blank submitted. Personal conferences are arranged when necessary to ascertain the

applicant's fitness for success. An opportunity to take interest and aptitude tests may be included.

Other:

Personal attributes of maturity, interest, aptitude, and physical condition so as to profit by instruction in chosen field.

Course Summary:

The Food Service Supervision program is designed to train students for supervisory positions in institutional, commercial, industrial, and school food service units. The curriculum combines theory and practice in all aspects of food service, including menu planning; selection, purchase, preparation, storage, and service of quantity food; selection, care, and maintenance of equipment; and techniques of organization and management. During the first three quarters of the program, students have a minimum of 10 hours per week of cooperative experience on an employed basis in Ferris Food Services on campus. Graduates of the two-year Food Service Supervision program are awarded the Associate in Applied Science degree.

TABLE II

Means (M), Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criteria of total grade-point average (r) and core curriculum grade-point average (r_1) for Age and Education.

	M	SD	Range	r	r_1
Age (years)	22.2	4.5	19-48	.101	.010
Education (years)	14.4	.5	14-16	-.007	-.063

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002, IBM were administered in 5/64. All 12 tests of the GATB, B-1002, NCS Form B were administered in 5/66, 2/67, 6/67, and 2/68. All students were tested in their 5th or 6th quarter.

CRITERION

The criterion was the total grade-point average earned in the six-quarter Food Service Supervision curriculum. Grade-point averages were computed as follows: total number of honor points (A-4, B-3, C-2, D-1, E-0) received divided by course hours taken and multiplied by 100.

Criterion Distribution:

Mean: 241.4
Standard Deviation: 45.9
Range: 167-347

Criterion Dichotomy:

The criterion was dichotomized by placing approximately one-third of the sample in the low criterion group. The low criterion group consisted of those students who failed to meet the criterion score of 219 on the total grade-point average. Students in the high criterion group were designated as "good students" and those in the low group as "poor students."

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were considered for tryout in the norms on the basis of a qualitative analysis of the courses studied and a statistical analyses of test and criterion data. Aptitude G, V, N, Q, and M were considered for inclusion in the norms because the qualitative analysis indicated they were important in the course study. Aptitudes P, Q, and M had high means and Aptitudes G, V, N, and Q had low standard deviations. There were no significant correlations between the aptitudes and the criterion. Tables III , IV, and V show the results of the qualitative and statistical analyses.

TABLE III

(Based on the course analysis, the following aptitudes appear to be important for successful completion of the Food Service Supervision curriculum.)

Aptitude	Rationale
G - General Learning Ability	Important in understanding and completion of course work; learning supervisory skills; in planning and coordinating.
V - Verbal Aptitude	Important in communicating, supervising, planning menus and requisitioning supplies.
N - Numerical Aptitude	Important in keeping records and inventory, estimating costs, yield of recipes, and converting weights and measures.
Q - Clerical Perception	Important in keeping records, checking prepared foods, changing yield of recipes, and conversion of weights and measures.
M - Manual Dexterity	Important in handling and preparing food, in serving, in care and maintenance of equipment.

TABLE IV

Means (M), Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criteria of Total Grade-Point Average (r) and Core Curriculum Grade-Point Average (r_1) for the Aptitudes of the GATB

Aptitude	M	SD	Range	r	r_1
G-General Learning Ability	108.5	8.7	89-127	.095	-.034
V - Verbal Aptitude	101.3	7.9	88-121	.248	.044
N - Numerical Aptitude	110.4	11.9	76-138	.016	.059
S - Spatial Aptitude	107.2	16.3	78-137	.027	-.100
P - Form Perception	119.6	14.1	84-157	-.117	-.108
Q - Clerical Perception	118.7	10.1	97-138	.046	.095
K - Motor Coordination	108.5	14.8	76-138	.083	.196
F - Finger Dexterity	99.6	17.3	55-140	.006	.133
M - Manual Dexterity	116.1	17.1	65-153	-.090	.091

TABLE V

Type of Evidence	APTITUDES								
	G	V	N	S	P	Q	K	F	M
Course Analysis Data Important	x	x	x			x			x
Irrelevant									
Relatively High Mean					x	x			x
Relatively Low Standard Deviation	x	x	x			x			
Significant Correlation with Criterion 1									
Significant Correlation with Criterion 2									
Aptitudes to be Considered for Trial Norms	G	V	N			Q			M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of Aptitudes G, V, N, Q, and M, at trial cutting scores, were able to differentiate between the 66% of the sample considered good students and the 34% of the sample considered poor students. Trial cutting scores at five-point intervals approximately one standard deviation below the mean are tried because this will eliminate about 1/3 of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about 1/3 of the sample; for four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about 1/3 of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Three-aptitude norms of G-95, Q-100, and M-110 provided optimum differentiation. The validity of these norms is shown in Table VI and is indicated by a Phi Coefficient of .24 (statistically significant at the .05 level).

Concurrent Validity of Test Norms, G-95, Q-100, and M-110

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	8	25	33
Poor Students	9	8	17
Total	17	33	50

Phi Coefficient ($\emptyset$) = .24
Significance Level = $P/2 < .05$

Chi Square (X^2_y) = 2.9

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future grouping of occupations in the development of new occupational aptitude patterns.

APPENDIX

Required Course Curriculum:

The following courses must be successfully completed by students in the Food Service Supervision program at Ferris State College in order to be awarded the Associate in Applied Science degree.

Non-Core Curriculum

Continuing Orientation - 1 hour/week (1st quarter)

English - 3 hours/week (1st and 2nd quarter)

Biological Science - 4 hours/week (1st and 2nd quarter)

Elementary Typewriting or Intermediate Typewriting - 3 hours/week (1st quarter)

Physical Education - 1/2 hour/week (1st, 2nd, and 3rd quarter)

Health Education - 1-1/2 hours/week (1st quarter)

Social Science - 3 hours/week (3rd and 4th quarter)

Speech - 4 hours/week (3rd and 4th quarter)

Marketing - 2 hours/week (4th quarter)

Psychology - 3 hours/week (5th quarter) and 4 hours/week (6th quarter)

Political Science - 3 hours/week (5th and 6th quarter)

Elective - 3 hours/week (5th and 6th quarter)

Humanities - 3 hours/week (6th quarter)

Core Curriculum

Introduction to Food Service Supervision - 3 hours/week (1st quarter)

Introduction to principles of Food Service Supervision in institutional, commercial, industrial, and school food service. Also included are fundamental principles of food preparation and cookery.

Purchasing and Storage - 5 hours/week (4th quarter)

Purchasing policies and procedures for buying and storing food in quantity. Includes study of sources, grades, standards of quality , basis of selection, and methods of purchase and storage of various food forms. Emphasis on supervisory experience in Ferris Food Services.

Record Keeping - 3 hours/week (4th quarter)

Principles and procedures in use of records for control in various food service operations such as food cost records, equipment, personnel, and inventory.

Institutional Equipment and Layout - 3 hours/week (4th quarter)

Selection, care, and maintenance of equipment used in quantity food preparation and service. Principles of efficient lay-out and arrangement of equipment.

Organization and Management - 5 hours/week (5th quarter)

Theory and practice in responsibilities of food service supervisor. Emphasis on personnel management and organization of all food service operations.

Food Preservation and Meat Technology - 3 hours/week (5th quarter)

Principles of food preservation with emphasis on quick-freezing, canning and dehydration, fermentation, pickling, and smoking. Study of commercial cutting of meat.

Catering -5 hours/week (6th quarter)

Theory and practice in organization and supervision of special food preparation and set-up related to catering service.

Core Curriculum (cont'd)

Cooperative Experience - 1 hour/week (1st, 2nd, and 3rd quarter)

Practice in quantity food preparation, salad, range, vegetable, and bake shop. Course work includes 10 non-credit hours/week of cooperative experience on an employed basis in Ferris Food Service (1st, 2nd, and 3rd quarter).

Nutrition - 3 hours/week (2nd quarter)

Introduction to the fundamentals of nutrition. Sources of nutrients and contribution of various nutrients to diet. Effects of cooking processes on nutrients. Diet therapy in all types of food service except hospital.

Food Sanitation - 3 hours/week (2nd quarter)

Principles of sanitation in the preparation, storage, and service of food. Study of food-borne diseases, food poisoning, and transmission of diseases by food and food handlers.

Menu Planning - 3 hours/week (3rd quarter)

Principles of menu planning for institutional, commercial, industrial, and school service. Study includes aspects of nutrition, organization, and cost in planning menu.

Food Service Calculations and Cost Estimating - 3 hours/week (3rd quarter)

Application of fundamental arithmetical processes to large quantity food service. Practice in estimating cost of recipes and menus, changing yield of recipes, conversion of weights and measures, and percentages involved in financial budgeting and recording.

Entrance Requirements:

Graduation from high school or equivalent, or sufficient maturity, motivation and aptitude to profit from instruction.

Grading System:

Ferris State College uses a grading system based on a four-point scale, with A=4, Excellent; B=3, Good; C=2, Average; D=1, Poor; F=0, Failed.

Certification:

Students must complete the prescribed courses with a cumulative honor point average of 2.0 or better in the Food Service Supervision program to qualify for the Associate in Applied Science degree conferred by the Collegiate Technical Division of the Ferris State School of Technical and Applied Arts.

Accreditation:

Ferris State College of Big Rapids, Michigan is accredited by the North Central Association of Colleges and Secondary Schools and the Michigan Commission on College Accreditation.

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FACT SHEET

JOB TITLE: Food-Service Supervisor (hotel & rest.) 319.138-010

Job Summary:

Supervises employees engaged in serving food in institutional, commercial, industrial, or school food service departments, and in maintaining cleanliness of food service areas and equipment. Instructs workers in methods of performing duties and coordinates work of employees to promote efficiency of operations. Supervises serving of meals in dining room. Oversees cleaning of kitchen and dining areas and washing of kitchen utensils and equipment, according to sanitary standards. Keeps records on personnel, food cost, and inventory. Requisitions supplies and equipment to maintain stock levels. May direct preparation of foods and beverages. May assist in planning menus.

Course Summary:

The Food Service Supervision program is designed to train students for supervisory positions in institutional, commercial, industrial, and school food service units. The curriculum combines theory and practice in all aspects of food service, including menu planning; selection, purchase, preparation, storage, and service of quantity food; selection, care, and maintenance of equipment; and techniques of organization and management. During the first three quarters of the program, students have a minimum of 10 hours per week of cooperative experience on an employed basis in Ferris Food Services on campus. Graduates of the two-year Food Service Supervision program are awarded the Associate in Applied Science degree.

Effectiveness of Norms:

Only 66% of the nontest-selected students in the sample used for this study were good students; if the students had been test-selected with S-440 norms, 76% would have been good students. 34% of the non-test-selected students used for this study were poor students; if the students had been test-selected with the S-440 norms, only 24% would have been poor students.

Applicability of S-440 Norms:

The aptitude test battery is applicable to jobs which include a majority of the duties described in the job summary.